

REMARKS

Applicants have amended their claims in order to further clarify the definition of various aspects of the present invention. Specifically, Applicants have amended claim 1 to further define how the modified colloid particles of a stannic oxide-zirconium oxide composite are formed, i.e., by deleting recitation of how such composite is formed from original claim 1, and by substituting therefor the steps of how such composite is formed from claim 3. In light of amendments to claim 1, Applicants have cancelled claims 3, 4 and 9-11 without prejudice or disclaimer.

Moreover, Applicants are adding new claim 12 to the application. Claim 12, dependent on claim 1, recites that the modified colloid particles of the stannic oxide-zirconium oxide composite have a spherical shape. Note, for example, page 7, lines 9-13, of Applicants' specification.

Applicants respectfully submit that all of the claims presented for consideration by the Examiner patentably distinguish over the teachings of the references applied by the Examiner in rejecting claims in the Office Action mailed March 26, 2010, that is, the teachings of the U.S. patents to Suzuki, et al., Patent No. 6,626,987, and to Crompton, et al., Patent No. 4,017,418, and Japanese Patent Document No. 2000-281973 (Ito, et al.), under the provisions of 35 USC 103.

It is respectfully submitted that these references as applied by the Examiner would have neither disclosed nor would have suggested such a method for producing a plastic lens as in the present claims, which includes forming a hard coat by coating a plastic substrate with a coating composition comprising (A) modified colloid particles of a stannic oxide-zirconium oxide composite and (B) an organosilicon compound, wherein the modified colloid particles of a stannic oxide-zirconium oxide composite are formed by processing steps (a)-(f) in claim 1, with

these steps including forming colloid particles of stannic oxide having diameters of 4-50 nm by reacting hydrogen peroxide and metallic tin in an aqueous solution of an organic acid in a manner such that a concentration of stannic oxide is 40% by weight or smaller while a ratio of amounts by mol of hydrogen peroxide to metallic tin, H_2O_2/Sn , is kept in a range of 2-4, among the other steps, steps (b)-(f), of claim 1.

In addition, it is respectfully submitted that the teachings of these applied references would have neither disclosed nor would have suggested such a method for producing a plastic lens as in the present claims, having features as discussed previously in connection with claim 1, and, additionally, wherein the modified colloid particles of the stannic oxide-zirconium oxide composite have a spherical shape.

Note claim 12.

With the stannic oxide-zirconium oxide composite having a spherical shape, the particles can stay in a greater concentration with longer storage stability than that in Ito, et al. and in Suzuki, et al., discussed infra, which particles have a spindle shape. Note, for example, page 7, lines 6-13, of Applicants' specification.

In addition, it is respectfully submitted that the teachings of the applied references would have neither disclosed nor would have suggested such a method for producing a plastic lens as in the present claims, having features as in claim 1 as discussed previously, and, moreover, wherein the organic acid used in step (a) in forming the modified colloid particles of stannic oxide-zirconium oxide composite is oxalic acid or an organic acid comprising oxalic acid as a main component (see claim 2); and/or the organosilicon compound of component (B), as in claim 5; and/or amount of colloid particles of component (A) per 100 parts by weight of the organosilicon compound of component (B), in the coating composition, as in claim 6; and/or wherein the coating composition further comprises (C) a metal salt of

acetylacetone (see claim 7); and/or wherein a film formed by vapor deposition is formed on the hard coat film formed by coating a plastic substrate with the coating composition recited in claim 1 (see claim 8).

The present invention is directed to a method for producing a plastic lens, in particular, for forming a hard coat film by coating a plastic substrate with a coating composition, in producing the plastic lens.

As described in section [0002] on page 2 of Applicants' specification, a plastic lens having a hard coat film using a coating composition comprising an organosilicon compound and modified colloid particles of a stannic oxide-zirconium oxide composite having diameters of 4.5-60 nm which are formed by coating the surface of nuclei with colloid particles of a tungsten oxide-stannic oxide-silicon dioxide composite having diameters of 2-7 nm, with a specified ratio of amounts of the various compounds, using as the nuclei colloid particles of a stannic oxide-zirconium oxide composite having specified features, has previously been proposed.

Notwithstanding previous proposals, it is desired to provide a hard coat film, and a plastic lens having such hard coat film, having improved scratch resistance and refractive index, without adverse effects on various properties such as the property of preventing yellowing under irradiation with ultraviolet light and adhesion.

Against this background, and as a result of intensive studies by the present inventors, it has been found that a hard coat film exhibiting improved properties as discussed in the foregoing can be achieved by coating a plastic substrate with a coating composition having been formed as recited in present claim 1, including, inter alia, use of the organic acid in step (a). By processing as in claim 1, modified colloid particles of stannic oxide-zirconium oxide composite having a spherical shape are formed, and the particles can stay in a greater concentration with longer storage

stability than that of particles formed conventionally as in, e.g., Ito, et al. and Suzuki, et al., discussed infra, having a spindle shape. Thus, the coating composition of the present invention can provide a coated plastic lens, with a hard coat film, having improved scratch resistance without adverse effects on other properties.

Ito, et al. discloses stannic oxide-zirconium oxide composite particles having particle sizes of 4-50 nm, formed by bonding stannic oxide colloid particles to zirconium oxide colloid particles in a weight ratio of ZrO_2/SnO_2 of 0.02-1.0. The modified stannic oxide-zirconium oxide colloid particles have particle sizes of 4.5-60 nm, and are prepared by coating at least a part of the surfaces of the stannic oxide-zirconium oxide colloid particles with tungsten oxide-stannic oxide-silicon dioxide composite colloid particles which have particles sizes of 2-7 nm and of which the weight ratios of WO_3/SnO_2 and SiO_2/SnO_2 are each 0.1-100. Note the English abstract of Ito, et al. Note also paragraphs [0006] and [0009] of the machine-generated English translation of this patent document, further disclosing the colloidal particles, and paragraph [0009] disclosing that the composite particles can be formed by processes (a)-(e) as described in paragraphs [0010]-[0034] of this machine-generated translation. Paragraph [0039] of Ito, et al. discloses that the sol obtained in processes (a)-(e) is used as an (A) ingredient in the coating composition, together with an organosilicon compound used as a (B) ingredient as disclosed most generally in paragraph [0040] of this patent document.

It is respectfully submitted that this reference does not disclose, nor would have suggested, such processing for forming the ingredient (A) of the coating composition, including, among other features, forming colloid particles of stannic oxide having diameters of 4-50 nm by reacting hydrogen peroxide and metallic tin in an aqueous solution of an organic acid, in a manner such that a concentration of

stannic oxide is 40% by weight or smaller with a specific ratio of amounts by mol of hydrogen peroxide to metallic tin, among other processing in forming the component (A), providing advantages as in the present claims including wherein modified colloid particles of the stannic oxide-zirconium oxide composite can have a spherical shape (note claim 12), and advantages of this feature of the present invention.

It is respectfully submitted that the additional teachings of Suzuki, et al. and of Crompton, et al. would not have rectified the deficiencies of Ito, et al., such that the presently claimed invention as a whole would have been obvious to one of ordinary skill in the art.

Suzuki, et al. discloses a stable modified metal oxide sol which contains particles comprising colloidal particles of a metal oxide as nuclei and a coating material consisting of an alkali salt of an acidic oxide, colloidal particles of an acidic oxide or a mixture thereof, coated on the surface of the colloidal particles as nuclei, and a process for producing such sol. As for the stable modified metal oxide sol, note column 3, lines 36-54 and 62-65. As for a process for producing the modified metal oxide sol, note column 4, lines 12-20, describing a process which includes mixing an aqueous sol containing the colloidal particles (a) of a metal oxide as nuclei, and an aqueous solution of a water-soluble alkali antimonate as the coating material (b), in a weight ratio of (b)/(a) of from 0.01-1 as calculated as metal oxides, and heating the aqueous medium, followed by cationic exchange. Note also the paragraph bridging columns 5 and 6 of this patent document. See also column 7, lines 25-46, disclosing first and second processes for producing the modified metal oxide sol.

Crompton, et al. discloses a method which includes introducing particles of antimonate trioxide into a polar organic solvent selected from the group consisting of formamide, methylformamide, dimethylformamide, acetamide, methylacetamide, dimethylacetamide, dimethylsulfoxide, formic acid, tetramethylurea, methanol and ethanol, and contacting the particles with aqueous hydrogen peroxide, in the presence of an aliphatic alpha-hydroxy carboxylic acid, and a halogen acid selected from the group consisting of hydrogen chloride, hydrogen bromide and hydrogen iodide, at a temperature of from about 0°C to about the decomposition temperature of the reaction mixture for a length of time sufficient to convert at least a portion of the antimony particles to colloidal particles of hydrous antimony pentoxide.

Initially, it is noted that Crompton, et al. is directed specifically to a process for making colloidal sols of antimony pentoxide, used in flameproofing systems to avoid delustering of fibrous polymers. It is respectfully submitted that one of ordinary skill in the art concerned with in Ito, et al., to provide a coating composition of modified stannic oxide-zirconium oxide colloid particles, to coat an optical substrate, would not have looked to the teachings of Crompton, et al. That is, in view of the different technologies involved in Ito, et al., on the one hand, and Crompton, et al., on the other, as well as different problems addressed by each (Crompton, et al. being directed to providing hydrous antimony pentoxide sols which can be employed as flame retardant agents in natural and synthetic fibers and other polymeric materials), one of ordinary skill in the art concerned with in Ito, et al. would not have looked to the teachings of Crompton, et al., these references being directed to non-analogous arts.

Furthermore, in view of differences in involved technologies and differences in problems addressed, it is respectfully submitted that one of ordinary skill in the art

concerned with in Ito, et al. would have had no reason to look to the teachings of Crompton, et al., absent hindsight use of Applicants' disclosure, which hindsight use is improper under the requirements of 35 USC 103.

In any event, even assuming, arguendo, that the teachings of Crompton, et al. were properly combinable with the teachings of Ito, et al. and Suzuki, et al., such combined teachings would have neither disclosed nor would have suggested the presently claimed subject matter, including features thereof as discussed in the foregoing, such as wherein the colloid particles of stannic oxide are formed by reacting hydrogen peroxide and metallic tin in an aqueous solution of an organic acid, and advantages achieved thereby, e.g., wherein modified colloid particles of the stannic oxide-zirconium oxide composite can be produced to have a spherical shape, as well as other features of the present invention as in the present claims, discussed previously, and advantages thereof.

As recognized by the Examiner in the second full paragraph on page 3 of the Office Action mailed March 26, 2010, Ito, et al. and Suzuki, et al. "fail to teach the use of an organic acid"; but the Examiner relies on Crompton, et al. as teaching the use of an organic acid, the Examiner contending that this reference describes use of an organic acid to "help stabilize a colloidal sol", the Examiner referring to column 1, lines 1 and 2. However, it is respectfully submitted that this reference discloses use of the aliphatic alpha-hydroxy carboxylic acid as a stabilizer in producing colloidal particles of hydrous antimony pentoxide, from particles of antimony trioxide. It is respectfully submitted that this reference, either alone or in combination with the teachings of the other applied references, would have neither disclosed nor would have suggested forming colloidal particles of stannic oxide having diameters of 4-50 nm by reacting hydrogen peroxide and metallic tin in an aqueous solution of an

organic acid, much less that by the processing as in claim 1, including step (a), modified colloid particles of a stannic oxide-zirconium oxide composite, having a spherical shape, can be formed.

In view of the foregoing comments and amendments, reconsideration and allowance of all claims presently pending in the above-identified application are respectfully requested.

To the extent necessary, Applicants hereby petition for an extension of time under 37 CFR 1.136. Kindly charge any shortage of fees due in connection with the filing of this paper, including any extension of time fees, to the Deposit Account of Antonelli, Terry, Stout & Kraus, LLP, Account No. 01-2135 (case 396.46575X00), and please credit any overpayments to such Deposit Account.

Respectfully submitted,

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